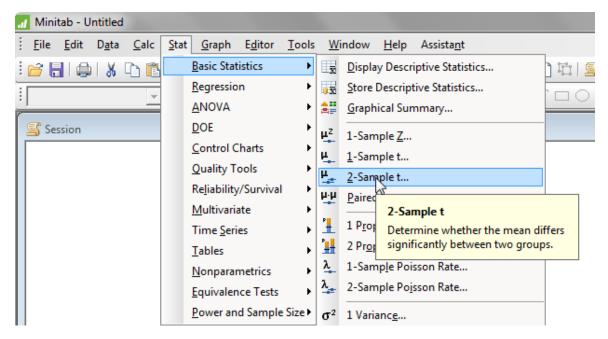
2-Sample-t command in Minitab 17

for confidence intervals and hypothesis tests on two means

Read the 1-sample-t document before reading this, because there are many similarities.



There are three ways that the data can be read in:

- Both samples are in one column
- Each sample is in its own column
- Summarized data

Here is the worksheet with two different sets of data. Columns A and B have both samples in one column. Columns D and E have each sample in its own column.

Worksheet 1 ***									
Ŧ	C1	C1 C2-T		C4	C5	С			
	Length	Group		Group A	Group B				
1	3.1	Control		103	92				
2	2.9	Control		68	126				
3	3.7	Treatment		79	114				
4	3.1	Control		106	106				
5	4.9	Treatment		72	89				
6	4.7	Treatment		121	137				
7	3.2	Treatment		92	93				

X

х Two-Sample t for the Mean Two-Sample t for the Mean

Here is how we read in the data from each of those.

C1 Length C2 Group C4 Group A C5 Group B	Both samples are in one column Samples: Length Sample IDs: Group	C1 C4 C5	Length Group A Group B	Each sample is in its own column Sample 1: 'Group A' Sample 2: 'Group B'
Select	Options		Select	Options
Help	<u>Q</u> K Cancel		Help	<u>O</u> K Cancel

Below left is how to enter summarized data.

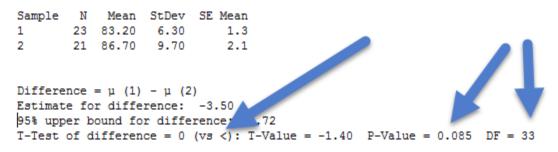
Below right is how to test Ho: Mean 1 = Mean 2 versus Ha: Mean 1 < Mean 2. The screen on the right is the same no matter how the two-sample data was entered.

Notice that we DO NOT check the box for equal variances. (See the green arrow.)

Two-Sample t for the Me	an	T	Two-Sample t for the Mean
	Summarized data	.	Two-Sample t: Options
		ample 2	Difference = (sample 1 mean) - (sample 2 mean)
		36.7	rpothesized difference: 0.0
			Prnative hypothesis: Difference < hypothesized difference
Select	Optio <u>n</u> s	<u>G</u> raphs	Assume equal variances
Help	Ōĸ	Cancel	Help <u>QK</u> Cancel

Below is the output. Notice the degrees of freedom the software computed is different from that we use when doing the calculation by hand. This is a more accurate answer.

Two-Sample T-Test and CI



To form a 90% confidence interval for the difference of Mean 1 and Mean 2 we do three things

- Enter the 90%
- Make the alternative hypothesis statement two-sided
- Do not check the "Assume equal variances" box

Two-Sample t for the Mean	Two-Sample t for the Mean
Summarized data	Two-Sample t: Options
Sample 1 Sample 2 Sample size: 23 21	Difference = (sample 1 mean) - (sample 2 mean
Sample mean: 83.2 86.7	Confidence level: 90.0
Standard deviation: 6.3 9.7	Epothesized difference: 0.0
Select Options Graphs	mative hypothesis: Difference ≠ hypothesized difference ▼
	Assume equal variances
QKCancel	
	Help <u>QK</u> Cancel

Two-Sample T-Test and CI

Sample	N	Mean	StDev	SE Mean				
1	23	83.20	6.30	1.3				
2	21	86.70	9.70	2.1				
Difference = μ (1) - μ (2)								
Estimate for difference: -3.50 90% CI for difference: (-7.72, 0.72)								
T-Test	of d	ifferen	ce = 0	(vs ≠): T-V	Value = -1.40	P-Value = 0.169	DF = 33	

So our output gives us the 90% confidence interval of (-7.72, 0.72).